Ain shams university **Faculty of science**

Synthesis , Characterization and Evaluation of Some Polyol Esters as Synthetic Lubricating Base Oils

A Thesis Submitted by

Mohamed Elsayed Haseeb Morgan

For the Degree of Ph.D. in Chemistry

To

Department of Chemistry

Faculty of Science

Ain Shams University

2019

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By

Mohamed Elsayed Haseeb Morgan

(M.Sc. in Chemistry 2014)

Prof.Dr. Ahmad Fawzi ELKafrawy

Professor of Organic Chemistry,

Faculty of Science, Ain Shams University

Prof. Dr. Galal Hosni Sayed

Professor of Organic Chemistry,

Faculty of Science, Ain Shams University

Prof. Dr. Ahmed Mohamed Al Sabbagh

Professor of Applied Chemistry,

Egyptian Petroleum Research Institute

Prof. Dr. Nehal Sabry Ahmed

Professor of Organic Chemistry,

Egyptian Petroleum Research Institute

Prof. Dr. Amal Mahmoud Mohamed Nassar

Professor of Organic Chemistry,

Egyptian Petroleum Research Institute

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Prof. Dr. Ahmed Fawzy El-Kafrawy (Late)

Prof. Dr. Galal Hosni Sayed

Prof. Dr.Ahmed Mohamed Al Sabbagh

Prof. Dr. Nehal Sabry Ahmed

Prof. Dr. Amal Mahmoud Nassar

Head of Chemistry department

Pof .Dr. Ayman Ayoub Abdel-Shafi

ACKNOWLEDGEMENT

I am in a greatest thankful to ALLAH, The Most Merciful, The Most Gracious, by the grace of whom the progress and success of the present work.

My deep thanks to **My Father**, **My Mother** and **My brother Haseeb** , God blesses their spirit.for supporting me in all kind of situation.

I would like to express my gratitude to **Prof. Dr. Ahmad Fawzi EL Kafrawy (Late)** Professor of Organic Chemistry, Ain Shams University, Egypt, for his kind supervision and **Prof.Dr. Galal Hosni Sayed**, Professor of Organic Chemistry, Ain Shams University, Egypt, for his direct supervising of the work, valuable discussions, encouragement, kind help given throughout this work

It is my pleasure to express my deepest thanks to my supervisor **Prof.Dr. Ahmed Mohamed Al Sabbagh**, Professor of Applied Organic Chemistry, Egyptian Petroleum Research Institute (EPRI) for his direct supervising of the work, valuable discussions, encouragement, kind help given throughout this work, I am greatly indebted for granting me for early stage research training and careful revision of the manuscript, for the

help he gives to tackle all scientific challenges, for support and encouragement

Many thanks to **Prof. Dr. Nehal Sabry Ahmed**, Professor of Organic Chemistry, Egyptian Petroleum Research Institute (EPRI) for suggesting the point of research, for her close and continuous supervision, her valuable advices, guidance make this research fruitful and applicable.

Words are not enough to thank **Prof. Dr. Amal Mahmoud Mohamed Nassar**, Professor of Organic Chemistry, Egyptian Petroleum Research Institute (EPRI) for suggesting the point of research, for her close and continuous supervision, her valuable advices, guidance make this research fruitful and applicable.

Deep thanks and gratitude to **Prof. Dr. Isamil Ali El magly** Professor of Applied Organic Chemistry, Egyptian Petroleum Research Institute (EPRI) for his kind supervision and valuable advices throughout all the steps of the work. His valuable knowledge is firmly printed in my mind also, for his guidance throughout my thesis.

My deep thanks to ***my brother*** (**Kamel**)*,* ***my sisters*** **(Hanan** and **Hoda**) especially for supporting me in all kind of situations

Mohamed Elsayed Haseeb Morgan

Contents

List Of Abbreviations

Flash Point	FP
Fourier Transform Infrared Spectroscopy	F.T.I.R
Modeular Compact Rhemoter	MCR
Mass Spectrum	MS
Neopentyl Glycol	NPG
Pour Point	PP
Poly Alpha Olefins	PAO
Polyalkylene Glycols	PAGs
Proton Nuclear Magnetic Resonance	^{1}H-NMR
Thermogravmetric analysis	TGA
Total Acid Number	TAN
Trimethylol propane	TMP
Viscosity Index	VI

List of Tables

List of Figures

Aim of work

The present work deals with preparation of complex esters and their use as synthetic base lubricating oils replacing mineral oils Preparation of new complex ester by using new catalyst Amberlyst 15 (ion exchange resin), the use of non conventional catalyst yields the derived products with negligible free acidity. The process has superiority with respect to easy handling, less reaction time ,lower molar ratio of acid to alcohol, energy saving and verifying yields of the order of 95% and above. Another advantage of these catalysts is that they can be recycled and used without loss of reactivity or decrease in yield . The advantages of complex esters are wide of viscosity range, high thermal and oxidative stability, high film thickness, surface activity, good biodegradability and low toxicity. They are active substitute for mineral oils . Engines in the contemporary time become a high-performance of which requires an oil sophisticated keep pace with

this development. capable oils to keep up with this development is the synthetic oils where mineral oils may not go along with this development .This is reflected well in the field of aviation which works by synthetic lubricating oils. Synthetic lubricating oils play an important role in the economies of the state in terms of their uses and important vitals where are used in special packaging conserved food which be used by man in his daily life. Nuclear stations does not fit the traditional use of mineral oils due to the presence of gamma rays that break the components of mineral oils causing problems, therefore it is necessary to use synthetic lubricating oils rather than these minerals. The stability of synthetic lubricating oils ordered them as the superior.

To achieve this goal, this work involved the following steps:

1-Esterification of dibasic acid with alkanols (amyl, 2-ethyl hexanol,hexanol and octanol.) by using new catalyst Amberlyst 15 (ion exchange resin).